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Cortisol Levels, Professional Burnout and Job Satisfaction in University Employees

Niveles de cortisol, desgaste profesional y satisfacción laboral en empleados universitarios

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Abstract
People's psychological relationship with work can be conceptualized as a continuum ranging from negative experiences of professional burnout to positive experiences, known as engagement. A retrospective ex post facto study was carried out for the purpose of exploring and measuring the degree of relation of professional burnout and job engagement to cortisol levels and the filing of claims for medical costs among university employees. One hundred ninety-nine subjects participated. A weak positive relation was found between the factor Emotional Exhaustion and cortisol levels, as well as a negative relationship between health symptoms and cortisol levels. No differences in burnout and cortisol levels were found between subjects who put in claims for health services and those who do not, or in health service claims when paired with the factors of professional burnout and cortisol levels. We conclude that low levels of cortisol could be related to engagement levels, and are related to low levels of professional burnout. We suggest that organization management should pay attention not just to administrative issues, but also to factors of organizational structure, the redesign of substantive activities, and the development of competencies for life development, as a way of contributing to overall organizational effectiveness.
Key words: cortisol, burnout, use of health services.

Resumen
La relación psicológica de la gente con su trabajo, se puede conceptualizar como un continuo entre experiencias negativas de desgaste profesional (burnout) y las positivas de entusiasmo laboral (engagement), como un estado opuesto al desgate profesional o relación positiva con el trabajo. Se utilizó un estudio ex post facto retrospectivo para explorar y medir la relación entre el desgaste profesional, el entusiasmo laboral, con niveles de cortisol para evaluar el estrés y reclamo de gastos médicos en empleados universitarios. Participaron 199 sujetos. Se encontró una correlación positiva baja entre el factor de desgaste emocional y los niveles de cortisol, y una negativa entre síntomas y niveles de cortisol. No se encontraron diferencias en desgaste profesional y niveles de cortisol entre los sujetos que reclaman servicios de salud y los que no lo hacen, tampoco entre reclamos de los servicios de salud con los factores del desgaste profesional y niveles de cortisol. Se concluye que los bajos niveles de cortisol podrían estar relacionados con los niveles de entusiasmo laboral y tendrían relación con los bajos niveles de desgaste profesional. Se sugiere que las organizacionales, además de las habilidades administrativas, pongan atención a factores de estructura organizacional, el rediseño de actividades y el desarrollo de competencias para la vida.
Palabras clave: cortisol, burnout, uso de servicios de salud.

People satisfy different needs at their job, which means that when job characteristics do not allow these needs to be satisfied, or make their satisfaction difficult, these characteristics can become a potential source of stress, impacting workers' physical health as well as the organization's productivity (Carreño García, Medina-Mora, Martínez Vélez, Juárez García, & Vázquez Pérez, 2006). For the last several decades it has been assumed that job-related stress leads to health problems and illness. The significant number of studies on these topics attests to the importance of problems associated with the growing levels of job-related stress, together with the increased costs of health care, as well as labor-market problems (Drach-Zahavy, 2008), as one of the byproducts of the worldwide financial crisis.

Teaching is a field where professional burnout has been extensively studied, among other reasons because it is a profession that deals directly with people. Factors contributing to burnout include changes in the role of teachers, lack of social recognition, the implementation of different educational models that put greater demands on teachers, scarce resources for coping with these demands, and interaction with students (Durán Extremera, Montalban, & Rey, 2005). These factors and others make burnout a relevant topic of study. (Quick, Nelson, Quick, & Orman, 2001).

Work-related stress has been widely recognized as an occupational hazard that can impair physical health, psychological well-being, and organizational performance (Maslach & Leiter, 2008). Stress can also be addressed from the perspective of people's relationship with their job and the difficulties that this relationship can cause (Hermosa Rodríguez, 2006). Many organizations have therefore begun to pay attention to their workers' health. Recent studies have looked at the opposite of burnout, which is known as engagement and defined as an energetic state of involvement with personally satisfying activities that enhance one's personal sense of professional effectiveness. According to Maslach and Leiter (2008), the multi-dimensional nature of the concept of professional engagement (Salanova, Schaufeli, Llorens, Peiro, & Grau, 2000) makes it more complex and complete than variables like commitment or satisfaction when it comes to examining people's relationship with their job.

According to Maslach and Leiter (2008), the inner experience of workers' effort plays a mediating role between the external impact of job-related demands (sources of stress) and job-related results, such as absenteeism or illness. This basic mediation model characterizes the phenomenon of job-related stress known as professional burnout, as well as its

positive counterpart, engagement. The authors point out that burnout is an unpleasant and dysfunctional condition that both people and organizations would prefer to change. Much of the interest in the study of these phenomena stems from a desire to understand them better in order to identify their interrelations and design effective interventions, especially preventive interventions. In the view of these authors, people's psychological relationship with their job can be regarded as a continuum between negative experiences of professional burnout and positive experiences of job engagement.

The three dimensions of burnout, according to Maslach, Schaufeli and Leiter (2001) are: Emotional Exhaustion-Energy, Cynicism-Involvement, and Ineffectiveness-Effectiveness. The component of Emotional Exhaustion represents the basic individual dimension of effort as part of the overall phenomenon of professional burnout. It refers to feelings of overload and exhaustion of emotional and physical resources. The component of Cynicism (or Depersonalization) represents the interpersonal context of the phenomenon of professional burnout, and refers to a negative, cruel or overly detached response to different aspects of the job. Finally, the ineffectiveness (or underachievement) component represents the self-evaluation dimension of professional burnout and refers to feelings of incompetence and lack of output and productivity on the job.

According to Durán et al. (2005), professionals in the field of academics are prone to developing burnout. These authors also assert that teachers experience increasing levels of stress, which affects their physical and emotional health as well as their results in terms of educational objectives.

In educational institutions, professionals are instruments that play an essential role in facilitating the development of job-related competencies, as well as competencies for life, which are just as important as professional skills. Paradoxically, these demands and expectations can easily become sources of dissatisfaction, or a sense of underachievement.

Job satisfaction is an indicator of job-related well-being. It is a psycho-social variable can be defined as a positive affective or emotional response to one's job in general or to some aspect of this job. This research makes use of a general assessment of job satisfaction, as recommended by Robbins (2009).

The variables under study have been approached from a different angle: as Manning, Jackson and Fusilier (1996) point out, there are studies based on self-reporting of both physical and mental health/illness and stress. This study uses an objective measure of stress (cortisol in saliva) and recourse to health services, as well as a checklist of health symptoms. It is important to introduce objective measurements into the study of the relation between the variables of burnout in academic workers and their physiological stress responses, such as cortisol (Castro, Martinelli, Antonini, Santiago, & Moreira, 2000; IBL-America, 2006; Kirschbaum & Hellhammer, 1989, 1994, 2000). One of the purposes of this study was to investigate the methodological usefulness of the objective measurement of the association between burnout, stress (salivary cortisol), and recourse to health services and job satisfaction in university employees.

Method

Participants

199 subjects participated (88 women and 111 men, ranging in age from 20 to 65 years). Full-time university employees. 150 with a spouse/partner and 49 without. 31% had a bachelor's degree; 44%, a master's degree; 10%, a PhD; and the rest, 13.5%, other.

Instruments

- General information
- Burnout instrument for Mexicans (EMEDO) (Uribe Prado, 2008), consisting of 30 items that measure the three factors of professional burnout: Emotional Exhaustion, Depersonalization and Dissatisfaction or Underachievement. It has a total Cronbach's alpha internal consistency of .89, with a range from .77 to .86, among the three factors.
- Symptoms List (Chibnall & Trait, 1989).

This list included 17 symptoms. Its Cronbach's alpha internal consistency = .81. The test-retest reliability coefficient is r = .53 (p<0.001).

- For the analysis of salivary cortisol levels, samples were collected in 1.7-mL polypropylene tubes, and the ELISA method (Gould & Stephano, 2005) was employed for their analysis, using a commercial kit (EIA DSL-10-67100) on each of the samples. The intra- and inter-test variability of these kits is less than 4.8% and 7.2% respectively.

Variables and procedure

A retrospective ex post facto design with one group was used, since the study focused on the relationship of the dependent variable with other independent variables (Montero & León, 2007).

Participants with major medical insurance were selected, and invited to participate in the study. Once they accepted, they signed a letter of consent. A contrast group was formed with participants who work at the university but do not have major medical insurance (n=55). A saliva sample was taken from all the participants during the afternoon in order to measure their cortisol levels, previous to their rinsing out their mouth with water and subsequently the instruments were applied. After these were answered, another saliva sample was taken. The time elapsed between one sample and the next did not exceed 30 minutes. All the saliva samples were taken in the afternoon to avoid variability in the hormone's circadian cycle in the morning (see Figure 1).

Data Analysis

The SPSS 15.0 program was used to analyze the data: descriptive statistics, variance analysis and Pearson product-moment correlations among the variables analyzed.

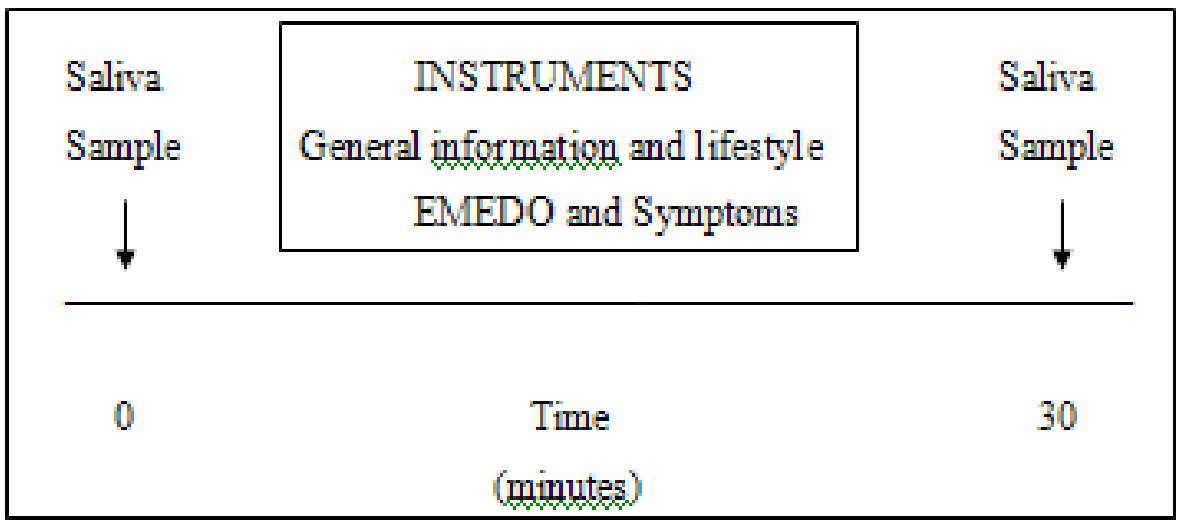

Figure 1. Procedure used in study.

Results

Since one of the objectives of this study was to explore the association among professional burnout, stress (salivary cortisol), job satisfaction and recourse to health services, a correlation analysis and variance analysis were carried out among the variables (Table 1).

As no significant differences were found between the two cortisol samples, the average of the two was used for the correlation analysis among the variables.

The aggregate results indicate a negative relation (r = -.15, p = .020) between cortisol and one of the three factors of the professional burnout syndrome: Emotional Exhaustion. However, the other two factors, Cynicism or Depersonalization, and Underachievement or Dissatisfaction with the results, showed no relation whatsoever, while the relation with the Frequency of Symptoms is negative (r = -.27, p = .024).

Moreover, the relation of these three factors with the Frequency of Symptoms is positive for Emotional Exhaustion, (r = .59, p = .0001), for Underachievement (r = .35, p= 0.0001) and for Depersonalization (r = .14, p = .021).

Overall job satisfaction registers a negative relation with the three factors of Professional Burnout. In first place, with the sense of Underachievement (r = -.519, p = .0001). Next comes the relation with Emotional Exhaustion (r = -.330; p = .0001) and finally with Cynicism or Depersonalization (r = -.232; p = .001). There is also a negative relation of job satisfaction with Frequency of Symptoms (r = -.263, p = .0001).

The analysis of the results of the groups formed by those who put in claims for major medical expenses, those who did not put in claims and those who did not have insurance shows no statistically significant differences in the perception of the three factors of Professional Burnout, Job Satisfaction, Frequency of Symptoms and Cortisol Levels.

Discussion

We expected to find that cortisol levels would show variations in accordance with the levels of professional burnout syndrome, as reported in the literature (Kudielka, Bellingranth, & Hellhammer, 2006; Sonnentag, 2006), and yet, contrary to expectations, we were only able to confirm a slight negative relation of cortisol with emotional exhaustion and with frequency of symptoms. As some authors report, no deregulation is observed between the HPA axis response and cortisol levels with professional burnout syndrome (Sertöz, Binbay, & Elbi Mete, 2008). It would seem that the lack of relation between cortisol levels and burnout-related variables could be explained by the low levels found, both of cortisol levels and of burnout, since various authors have reported that no HPA axis activation is found at low levels of professional burnout (Pruessner, Hellhammer, & Kirschbaum, 1999). This could also be explained by the following: consideration would have to be given to whether the subjects, at the moment of stress, were in the resistance or surrender phase (Selye, 1960); the duration of the stress would also have to

Table 1. Correlations among variables

Pearson Correlation						
N= 199	1	2	3	4	5	6
1. Cortisol		**-0.15** *	-0.06	-0.05	**-0.27***	-0.07
2. Emotional Exhaustion			0.11	**0.43** **	**0.59** **	**-0.33** **
3. Depersonalization				**0.33** **	**0.14** *	**-0.23** **
4. Underachievement					**0.35** **	**-0.52** **
5. Frequency of Symptoms						**-0.26** **
6. Job Satisfaction						

* p<0.05, **p<0.001

be considered: it could be chronic stress, in which no HPA axis reactive response would be seen, or acute stress, in which we would expect to find an increase in salivary cortisol levels.

Only a slight inverse relation is identified between emotional exhaustion and cortisol, and none between medical expense claims and cortisol levels; the results suggest that the phenomenon of engagement merits further exploration. From this perspective, it could be stated that there are participants in this study who instead of suffering from burnout, show job engagement. The slight relation between emotional exhaustion and cortisol gives limited support to the usefulness of objective measures of stress on the basis of salivary cortisol and its relation to professional burnout; further exploration of its methodological usefulness is called for.

The relation between the perception of symptom frequency and the three factors of professional burnout syndrome is positive. The relation for emotional exhaustion is the strongest. This indicates that as symptoms are experienced more frequently, the perception of emotional exhaustion increases, i.e., feelings of overload and exhaustion of emotional and physical resources. Next, the relation with underachievement or incompetency, which suggests that this factor increases the more the symptoms are perceived. Finally, the relation to depersonalization suggests that detachment from different aspects of the job increases as more symptoms are perceived, although moderately. The inverse relation of job satisfaction with professional burnout indicates that as satisfaction increases, the perception of burnout decreases. It is worth noting that the strongest inverse relation of job satisfaction is with regard to the sense of underachievement. This pattern – underachievement, exhaustion and depersonalization – is similar to the pattern found by Ortiz Valdés and Arias Galicia (2008) in a study of teachers from the western part of the country. This result suggests it should be important for the faculty of educational institutions to have a clear sense of their objectives and goals.

To conclude, it can be stated that only the partial negative relation of cortisol to one factor of Professional Burnout – Emotional Exhaustion – could be confirmed, which is consistent with other studies that have found that this factor is the most representative of professional burnout syndrome (Maslach, 2001). It would be important to explore this relation with different hormone responses, such as the circadian cortisol cycle, and to explore whether this cycle occurs regularly or whether a certain flattening is observed.

The relation between symptoms and the three factors of Professional Burnout suggests that, from the perspective of the management of higher education organizations, attention should be paid to factors that help personnel reach their goals: this would avoid the waste of personal energy (physical and emotional weariness due to administrative tasks that do not contribute to their substantive function and that are perceived as work overload). Attention should also be paid to fostering a positive relation between personnel and their job, so that staff members, especially from the teaching faculty, feel that they are instrumental to the educational mission of developing professional and life competencies (Durán, et al., 2005). This vision is reinforced by the inverse relation between job satisfaction and the three burnout factors. This perspective should be addressed specifically in other studies to generate a better understanding of how burnout occurs in populations like the one studied here, and to design preventive programs.

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Level of Authority and Response Cost in the Obedience of Schoolchildren

Nivel de autoridad y costo de respuesta en la obediencia de niños escolares

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Abstract
In the present study an analysis was made of the effect of establishing two levels of authority (Total or Partial) in the obedient behavior of schoolchildren under two test situations: one with no response cost for disobedient responses (NRC) and the other, with response cost for disobedient responses (RC). The level of authority was determined by the number of power functions, as proposed by Ribes (2001) that were wielded in the experimental situation. At the beginning of the experiment, half of the participants were exposed to a condition of Total Authority consisting of three sessions of computer games in the presence of the experimenter while he wielded the four power functions (prescription, regulation, supervision and the administration of consequences). The other half of the participants was exposed to a condition of Partial Authority in which these three sessions took place in the presence of the experimenter while she wielded only two of these functions (prescription and regulation). Subsequently, by means of a puzzle-solving activity that allowed for two types of response: one permitted (obedience) and another forbidden (disobedience), the participants were exposed to a baseline phase and to test phases alternating NRC and RC conditions. It was observed that the participants who were exposed to a Total Authority figure gave fewer disobedient responses than the participants exposed to a Partial Authority figure. Furthermore, it was observed that regardless of the level of authority that was established, the participants who started the test sessions with an NRC condition gave fewer disobedient responses than those starting with an RC condition. The results are discussed in terms of the effect of the presence of an authority figures who wield power functions in different ways, and in terms of their interaction with the response cost implemented in the situation.
Key words: authority, power functions, obedience, response cost, restitution

Resumen
En el presente estudio se analizó el efecto de establecer dos niveles de autoridad (Total o Parcial) en la conducta obediente de niños escolares bajo dos situaciones de prueba: una sin costo de respuestas desobedientes (SCR) y, la otra, con costo de respuestas desobedientes (CR). El nivel de autoridad se determinó por el número de funciones de poder, propuestas por Ribes (2001), ejercidas en la situación experimental. Al inicio del experimento, la mitad de los participantes se expusieron a una condición de Autoridad Total que consistió en tres sesiones de juegos de computadora realizadas en presencia del experimentador mientras éste ejerció las cuatro funciones de poder (prescripción, regulación, supervisión y administración de consecuencias). La otra mitad de los participantes se expuso a una condición de Autoridad Parcial en la que estas tres sesiones se llevaron a cabo en presencia del experimentador mientras éste ejerció sólo dos de dichas funciones (prescripción y regulación). Posteriormente, mediante una tarea de resolución de rompecabezas, que permitió establecer dos tipos de respuesta: una permitida (obediencia) y otra prohibida (desobediencia), los participantes se expusieron a una fase de línea base y a fases de prueba alternando condiciones SCR y CR. Se observó que los participantes expuestos a una figura de Autoridad Total, mostraron menos respuestas desobedientes que los participantes que se expusieron a una figura de Autoridad Parcial. Además se observó que, independientemente del nivel de autoridad establecida, los participantes que iniciaron las sesiones de prueba con una condición SCR, mostraron menos respuestas desobedientes que los que las iniciaron con una condición CR. Se discuten los resultados en términos del efecto de la presencia de figuras de autoridad que cumplen de forma diferencial con las funciones de poder y en términos de su interacción con el costo de respuesta implementado en la situación.
Palabras clave: autoridad, funciones de poder, obediencia, costo de respuesta, restitución.

"Authority" has been defined as the legitimate right held by one or more individuals to give orders and to be obeyed (Friedman, 1990; Raz, 1990a, 1990b; Wolff, 1990). It has been distinguished from "power," primarily because power, according to Raz (1990b), refers only to the capacity to make others do what one wants them to do without being a normative term, while "authority" is such a term. However, even though "authority" and "power" are terms that can be defined independently, as early as 1959 Levinger (1959) maintained that for an individual to be recognized as an authority figure, he must always possess a minimum of power. For this reason, an analysis of "authority" necessarily involves a consideration of "power."

According to Ribes (2001), "power" can be wielded by an individual (authority figure or not) in a particular situation by means of four functions, namely: prescription, regulation, supervision and the administration of consequences. The prescription function is wielded by stipulating all the activities that can or must be carried out in a given situation, as well as indicating the consequences that will ensue if these activities are or are not carried out. The regulation function is wielded by intervening to make adjustments to the situation in order to maintain the prescribed conditions. Supervision occurs when prescriptions are monitored and indications are given so that these prescriptions are carried out, by simply observing, and not explicitly making individuals change their behavior. Finally, the administration function is wielded by directly procuring consequences in the situation. In Ribes' view (2001), these functions can be wielded by one or more people in a situation. Furthermore, these people may or may not be recognized as authority figures, which, together with other factors, will generate differential effects in the behavior of the individuals over which these functions are wielded (Rangel & Ribes, 2009). According to these authors, one of the effects that are produced when an authority figure wields power in a given situation is "obedience."

In general terms, "obedience" is a social phenomenon that has sparked the interest of

psychologists for some time, as evidenced by the wide range of studies that have been conducted with an eye to evaluation (e.g., Díaz Guerrero, 2000; Lara, Gómez, & Fuentes, 1992), experimentation (e.g., Brant, 1980; Burger, 2009; Milgram 1974/2004; Shanab & Yanhva, 1978, in Blass, 1991) and technology (e.g., Ayala, Téllez, & Gutiérrez, 1994; Ayala et al., 2001; Marlow, Tinestrom, Olmi, & Edwards, 1997; Richman, et al., 1994; Roberts, Hatzenbuehler, & Bean, 1981; Robinson & Sheridan, 2000; Wilder, Harris, Reagan & Rasey, 12007; Yeager & McLaughing, 1995, among others).

Thus, obedience encompasses situations in which individuals change their behavior in response to direct orders from others (Baron & Byrne, 1982). This means that in a situation in which obedience is demanded, individuals must change their behavior in response to orders given by other individual(s), because if they do not, they will face negative sanctions imposed by the one giving the orders, i.e., by the authority figure. In this last case, it could be said that the choice between doing and not doing what is ordered is forced or influenced by explicitly programmed consequences. In fact, Baron and Byrne (1982) have suggested that obedience is the most direct technique that one person can use to modify another's behavior because it implies the capacity to apply severe punishments on those who do no obey her orders.

On the basis of the foregoing, this study assumes that people who are in a position to be obeyed and wish to wield this privilege, should base their actions on power and the wielding of its functions. In fact, in studies on obedience (e.g., Ayala, Téllez, & Gutiérrez, 1994; Ayala et al., 2001; Burger, 2009; Marlow, Tinestrom, Olmi, & Edwards, 1997; Milgram 1974/2004; Wilder, Harris, Reagan, & Rasey, 2007), the wielding of prescription can be identified with the explanation of what must and must not be done in a situation; regulation with the maintenance of the participants in the experimental situation; supervision, with the experimenter's monitoring and pointing out to the participants that they are doing what should or should not be done; and finally, the administration of consequences with the experimenter's interventions in the situation applying negative sanctions to the participants who disobey, generally by means of procedures like time-out and response cost (e.g., Roberts, Hatzenbuehler, & Bean; Marlow, et al., 1997; Richman et al., 1994; Yeager & MacLaughing, 1995). There has been no systematic study, however, of the role that these functions play in obedient behavior when they are wielded differentially.

Thus, the aim of the present study was to compare the obedience of schoolchildren in response to two levels of authority, as defined by the number of functions wielded by the authority figure in the situation, and their effects on two conditions, one having a response cost for disobedience and the other without such a response cost. The first level of authority was called Total Authority, since the experimenter wielded all four of the power functions mentioned above, while the second level of authority was called Partial Authority, since the experimenter wielded only two of these functions (prescription and regulation).

Method

Participants

Sixteen children (eight girls and eight boys) between the ages of nine and 13 years participated in the experiment in exchange for candy and snacks. The participants came voluntarily to the community center where the experiment was conducted. The only criterion for inclusion was that they had to be enrolled in the fifth or sixth grade of elementary school at the time of the experiment.

Equipment and experimental situation

For conducting the experiment, four portable Compaq Pentium 100 computers were used, with chromatic monitor, keyboard and mouse for responding, and a clock. The experimental tasks used (games like Hangman, Tetris, etc.), for the experimental treatment condition, and puzzles for the test and baseline conditions. The instructions were given in written and spoken form. The puzzle software was designed for Windows 95, using Visual Basic 6.0. The participants' responses were automatically re-

corded by the computer system. The data were analyzed using the Excel 2007 program, and represented graphically with Sigma Plot 10.0.

The experimental sessions were held in a room measuring 4 x 5 m, at a community center. In the room were four tables, four chairs and different objects that allowed a division to be placed between the tables on which the computer equipment was placed. These divisions made it possible to work at the same time with the four participants of each group, as continuous visual contact and any kind of communication among the participants was effectively blocked. The experimenter took up a location that was visible to the four participants the whole time the experimental session lasted. During one of the phases (the Authority Training phase), there was only one table in the room, along with four chairs, a computer and a clock; the rest of the objects were kept in the room, but out of the participants' reach.

Design

Table 1 presents the design used in this study, consisting of an intra- and inter-subject comparison under different experimental treatments. The participants were assigned randomly to one of four groups. All the participants were exposed to a Game Training session (to become familiarized with the task), specifically about the games that would be used in the following experimental phase, the Authority Training phase, consisting of the participants' exposure to one of the two levels of authority (Total or Partial) according to the number of power functions that the experimenter wielded during that phase. The participants from Groups 1 and 3 worked in a situation of Total Authority, while those from Groups 2 and 4 did so in a situation of Partial Authority. Subsequently, each participant was told that he would work with a partner (really a computer) to put together two identical puzzles, one belonging to him and the other to the partner. With this experimental task, the participants were exposed to a Baseline phase consisting of a situation of freely choosing responses between their own puzzle and their partner's. During this condition, the participant was allowed to respond on either one of the two puzzles for the purpose of establishing response preferences in each one of them. After this, the participants were exposed to four (groups 3 and 4) or five (Groups 1 and 2) test phases, in which response-cost and non-response-cost conditions (RC and NRC) were alternated for responding on their own puzzle (which was established as the forbidden puzzle starting with these test phases) (see Table 1).

The experiment was conducted for nine days for Groups 1 and 2, and for eight days for Groups 3 and 4. The Game Training session and the first session of the Experimental Treatment in Authority were conducted the first day. The remaining two treatment sessions

Table 1

	Pre-training	Experimental Treatment Authority Training		Test Phases				
Group 1	Game Training	Total Authority	Baseline	NRC	RC	NRC	RC	NRC
Group 2		Partial Authority		NRC	RC	NRC	RC	NRC
Group 3		Total Authority		RC	NRC	RC	NRC	
Group 4		Partial Authority		RC	NRC	RC	NRC	
Sessions	1	3	3	3	3	3	3	3
Days	1	1-3	4	5	6	7	8	9

Experimental design, where: NRC refers to the condition where there is no response cost for responding on the forbidden puzzle, and RC refers to the condition where there is a response cost for responding there.

were conducted the second and third days. The rest of the phases (Baseline and each NRC and RC phase) consisted of three sessions (puzzles) each, with one phase being conducted each day.

Procedure

Total Authority Training phase – establishment of history

After the period of training in six computer games, the participants were exposed to three sessions in which they could choose to play any of them: Tetris, Pac-man, Hangman, and other similar games. In each of the sessions, the four members of each group played on one computer. Each of them was to play for 5 minutes and then let the next participant have her turn, until each member had played for 15 minutes. The participants had a clock in front of them so that they could keep track of time themselves while they played. Before starting each session, the participants were told that there were behaviors that were not permitted, such as shouting, getting up from their place, saying bad words, hitting each other, hurting each other, or saying mean or rude things to each other, and that if any of them were caught behaving that way, they would have to leave the game for that day. It was stipulated that in the first two sessions of this phase, the participants would be taken out of the experimental cubicle the third time they did something forbidden, and that in the last session, if any of them behaved disruptively on more than one occasion, they would be eliminated from the experiment. The participants who remained in the experiment received a piece of candy at the end of the session. The experimenter, in this case the authority figure, was able to prescribe what was to be done and what was not to be done in the situation; regulate by making the participants stay in the experimental room; supervise the participants' behavior in the situation and administer consequences for what they did.

Partial Authority Training phase

This phase was handled the same way as the Total Authority phase, with indications of forbidden behavior, but without any penalties if they occurred. During this condition, no candy was handed out to the participants. The experimenter only prescribed what was to be done and what was not to be done in the experimental situation, and regulated by keeping the participants in the experimental room. She did not however supervise to see whether forbidden behaviors took place or not, nor were any consequences administered after their occurrence.

Starting with the Baseline phase, the experimental task consisted of putting together puzzles on the computer screen by placing pieces in their place using the mouse (See Figure 1). A different figure was presented for each experimental session (See Figure 2). Each puzzle consisted of 50 pieces and on the computer screen, two identical puzzles appeared, one on the left side and one on the right side of the screen. The puzzle on the left appeared under the heading *Partner's*, and the one on the right under the heading *Mine*. The participants had the possibility of placing pieces on either of the two puzzles, and the time for completing the task was unlimited.

Under each puzzle, two counters appeared, one that recorded correct responses and the other that recorded the points awarded for each piece that was correctly placed, either by the participant or by the partner. There was no counter for the Baseline condition, and other than in this condition, at the end of each session the participants could differentially exchange the points they scored for candy. Before the experimental sessions started, a sample of the prizes was shown with their respective point value. The experimenter was present in the experimental room while the participants were exposed to the different tasks making up the study.

During the test sessions, two kinds of responses were identified: 1) a forbidden response, consisting of responding on one's own puzzle, and 2) a permitted response, consisting of responding on the partner's puzzle. This made for a situation in which the authority figure could explicitly tell the participants what to do and what not to do. In view of the fact that when this task is used (Ribes, 2001; Ribes & Rangel, 2002; Ribes, Rangel, Casillas et al., 2003; Ribes, Rangel, Juárez et al., 2003, etc.), a marked preference for responding on one's own puzzle has been found, in the present experiment the responses on this puzzle were forbidden, and the responses

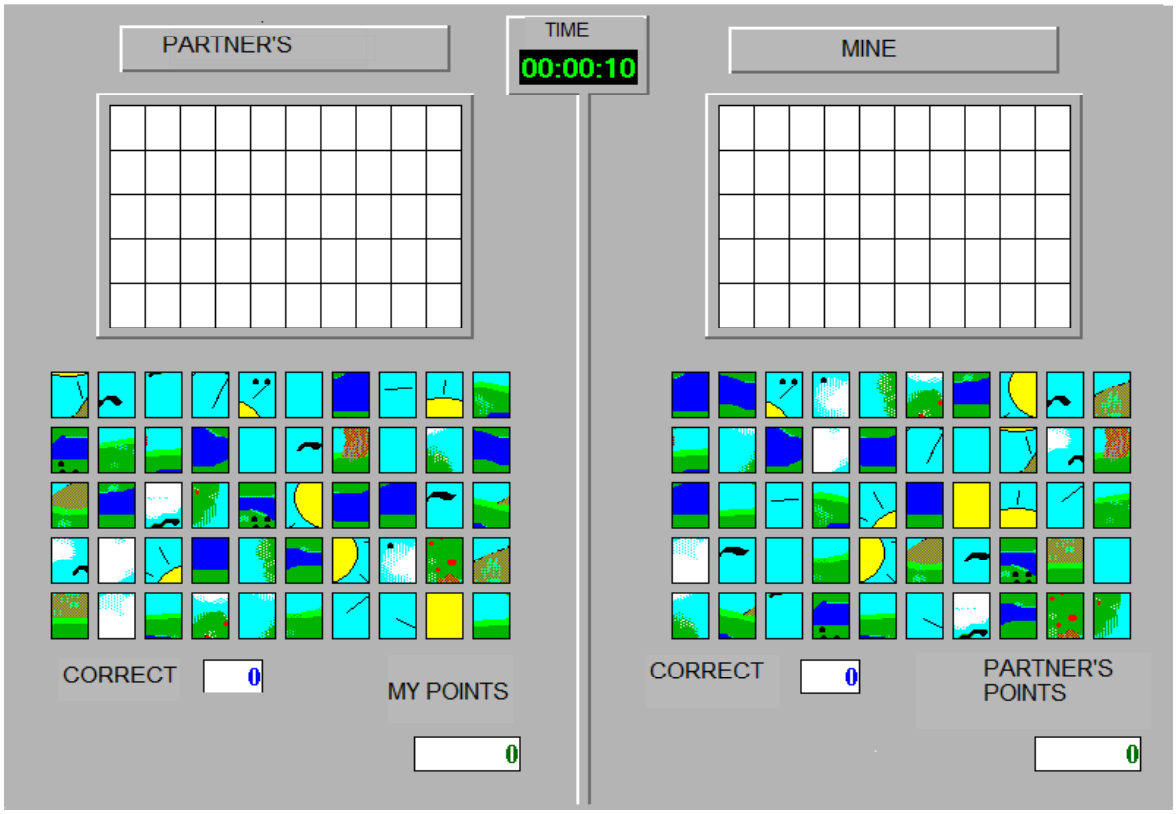

Figure 1. Shows the screen of the puzzles that the participants worked on.

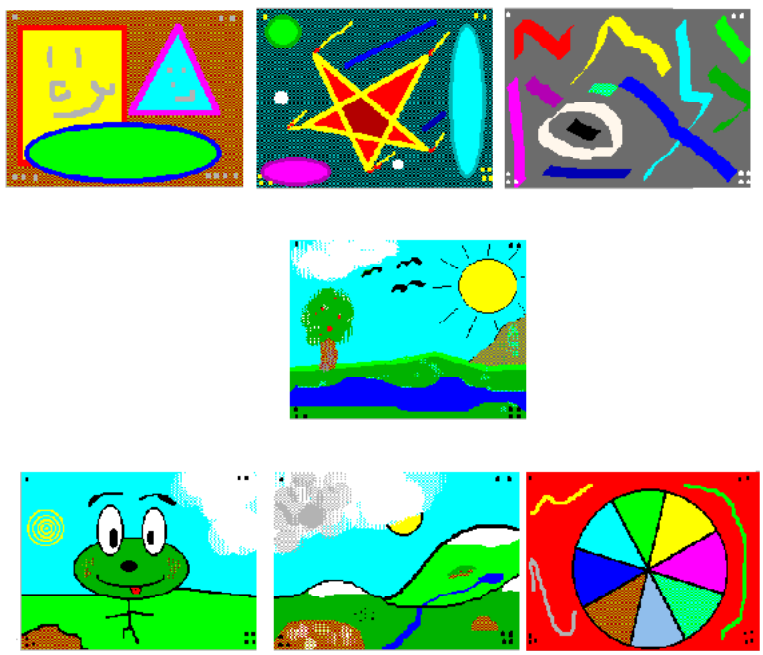

Figure 2. Shows some of the figures used on the puzzles.

on the partner's puzzle were allowed, the reasoning being that had the participants obeyed an order to respond only on their own puzzle, according to the experimental results this behavior could easily be occurring independently of the order given by the authority figure in the experimental situation.

In order to avoid any kind of bias toward disobedience, the partner, i.e., the computer, only placed pieces on the puzzle that the participant saw on her screen under the heading *Mine*, which made it seem that the partner was always obeying the experimenter's orders.

Baseline

Two puzzles appeared on the screen with the same figure, one of them under the title *Mine* and the other under the title *Partner's*. The participant was informed that he could assemble either of the two puzzles. As mentioned, over the course of the session the computer assembled only the puzzle that the participant had on the screen under the title *Mine*. The computer placed a piece every 15 seconds. The time allowed for completing the puzzle was unlimited, and the participant was not told about the points he earned or the right responses he made.

Non-Response Cost condition

In this condition, the participant was told she should only respond on the partner's puzzle. However, just as in the Baseline, she was able to manipulate either of the puzzles that appeared on the screen. The computer placed a piece in the puzzle that the participant saw under the title *Mine* every 15 seconds, and for each piece placed, 10 points were added to the counter that said *Partner's points*. For each piece that the participant placed correctly in the partner's puzzle, which was the puzzle she was permitted to work on, she got 10 points on the counter that said *My points*, while for each piece placed correctly in her own puzzle, which was the puzzle where she was forbidden to work, she got 40 points. The value on the forbidden puzzle was set to make up for the speed with which the machine placed pieces in this same puzzle, and so that it would have an effect on the forbidden or disobedient response (earn more points for this kind of response). In addition, with this, the values of the pieces were kept constant with respect to the response-cost condition. The participants were able to observe their points and those of their partner at any time during the session. If the participant finished putting together the permitted puzzle (the partner's) before the computer finished placing the pieces in the puzzle that the participant saw under the title *Mine*, the participant had to choose between waiting for his partner to assemble the puzzle to finish the session, or help him finish it, even though this meant giving responses on the forbidden puzzle (disobeying).

Response-Cost condition

This condition was conducted in the same way as the NRC condition, except that 20 points were subtracted from the participants' score every time they responded on their own puzzle. The participants were told that since they were not allowed to respond on that puzzle, they would lose 20 points every time they did it. These values were assigned so that even though responding on the forbidden puzzle had a cost, the participant would continue earning more points for disobeying; it was thought that if she earned fewer points by doing so, the probability of the forbidden behavior's occurring would drop. In this condition, a delayed-contingency situation was presented, since by completing the task, the participants could only observe the points that they earned, and not the ones that they lost. At the end of the session, the experimenter took off the 20 points for each piece placed on the participant's own puzzle. The participants could observe their points and their partner's at any time during the session.

Results

Figure 3 shows the data from the RC and NRC sessions as a proportion of changes with respect to the Baseline. To calculate this rate, the proportion of responses on the participants' own (forbidden) puzzle in each condition was divided by the proportion of responses on their own puzzle in the Baseline. Thus, if the rate val-

ue is 0, it means that the participant responded only on the permitted puzzle and was obedient during that condition; if the rate is 1 or less, it means that the participant gave some disobedient responses but fewer than in the Baseline, i.e., that she showed a certain degree of obedience; finally, if the rate is greater than 1, it means that the participant responded on the forbidden puzzle at higher levels than in the Baseline, i.e., she was disobedient. As Figure 3 shows, the participants that had the lowest disobedience rate were those from Group 1, who were exposed to Total Authority Training and started the test sessions with the NRC condition. Starting with the first RC condition, they gave only obedient responses for the rest of the experiment. The participants from Groups 2 and 3, exposed respectively to Partial Authority and Total Authority training, had a low disobedience rate (1 or less). Finally, the participants from Group 4, exposed to Partial Authority training and who started the test sessions with an RC condition, were the ones with the highest disobedience rates (up to 9) in NRC conditions. Since the score that the participants received in each session depended on their execution, the participants from Group 4 were the ones who kept earning the most points, especially in NRC conditions (up to 1500 points per session), while the rest of the participants, in most of the sessions, maintained a point level of 500, which was the most they could earn if they responded only on the permitted puzzle.

Figure 4 shows the total average (of all the participants) of the obedience/disobedience rate by condition (NRC/RC) and by authority

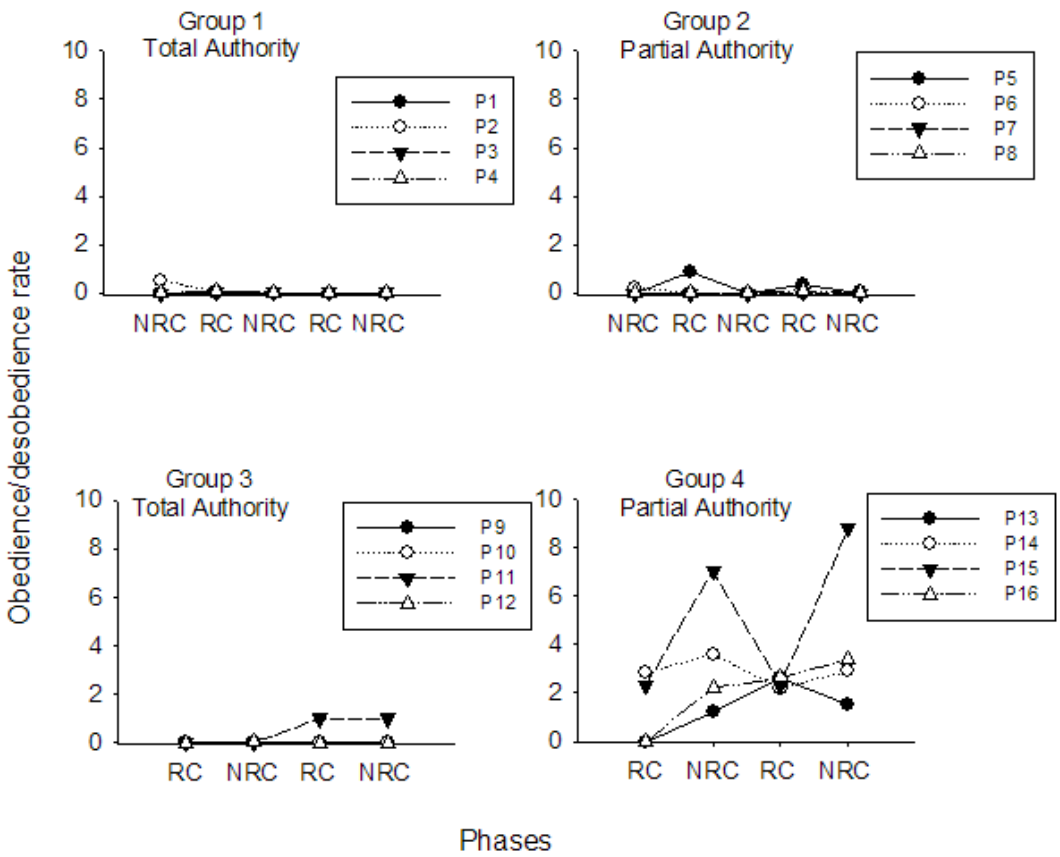

Figure 3. Shows the obedience/disobedience rate by participant. RC: Response-Cost Condition; NRC: Non-Response-Cost Condition.

level (Total, Partial). It can be observed that the participants in the Total Authority condition had rates close to 0 in both RC and NRC conditions, while the participants exposed to the Partial Authority condition showed higher disobedience rates especially in NRC conditions.

The following figures show the average of each experimental phase. Each phase consists of three sessions. The intra-phase variations are shown by means of their standard deviation.

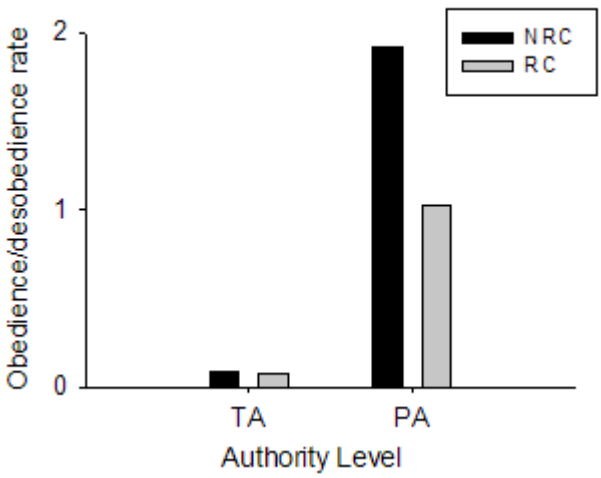

Figure 4. Shows the average (of all the participants) of the obedience/disobedience rate in each test condition and in each level of authority. TA: Total Authority; PA Partial Authority; RC: Response-Cost Condition; NRC: Non-Response-Cost Condition.

Figure 5 was devised for the purpose of observing whether the participants responded on the forbidden puzzle while they still had a chance to respond on the permitted puzzle (during) or whether they did it after they had finished assembling it (after). In very low response numbers, participants 3, 7 and 11 gave all the forbidden responses during, i.e., while they still had the chance to assemble the permitted puzzle; Participants 4, 6, 12 and 13, on the other hand, responded on the forbidden puzzle only after having completed the permitted one. Participants 2, 5 and 8 gave their forbidden responses both during and after. Special mention must be made of Participants 14, 15 and 16, who were the ones who responded the most on the forbidden puzzle. Participant 14 did so after having competed the permitted puzzle, while the other two (15 and 16) did so while they were still able to respond on the permitted one, making them the most disobedient participants of the experiment.

Figure 6 shows the time (average by phase) that each participant took to assemble the puzzles. In the first experimental sessions, all the participants took between 15 and 38 minutes per session. After the baseline, all the participants managed to finish the sessions in less than 18 minutes. Only Participant 14 was able to put puzzles together in less than 10 minutes.

Discussion

The aim of the present experiment was to compare the obedience of schoolchildren in response to 2 different levels of authority: a Total Authority who wielded the four power functions proposed by Ribes (2001) and a Partial Authority, who wielded only two of these functions (prescription and regulation), as well their impact on two conditions: one with a response cost and the other without a response cost for disobeying.

The results showed three important effects: 1) the participants from the groups that were exposed to a Total Authority figure showed lower rates of disobedience, including total obedience, than those exposed to a Partial Authority figure; 2) Group 1, which was exposed to a Total Authority figure and started the test phases with an NRC condition, was the group with the highest obedience rates, while Group 4, which was exposed to a Partial Authority figure and started the test phases with an RC condition, was the group with the highest disobedience rates (up to 9 in the case of some participants in some sessions); and 3) it would seem that regardless of the level of authority, starting the test phases with an RC condition favors higher disobedience rates than starting the treatment with an NRC condition.

This last effect could be attributable to the set-up of the RC condition, since even with the implementation of the response cost, the participants earned more points if they responded on the forbidden puzzle than if they limited their responses to the partner's puzzle. Regard-